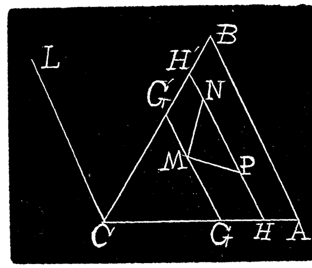
$$=\frac{6\sin A}{b^2c^3}\int_o^b\int_o^{x'}\int_o^x\left\{\int_o^u\int_o^{z'}(x-y)(u-v)dvdz\right.$$
$$\left.+\int_o^b\int_o^{z'}(x-y)(v-u)dvdz\right\}dudxdy$$
$$=\frac{6\sin A}{b^3c^2}\int_o^b\int_o^{x'}\int_o^x\left\{\int_o^u(x-y)(uv-v^2)dv\right.$$
$$\left.+\int_o^b(x-y)(v^2-uv)dv\right\}dudxdy$$
$$=\frac{\sin A}{b^3c^2}\int_o^b\int_o^{x'}\int_o^x(2u^3+2b^3-3b^2u)(x-y)dudxdy$$



$$=\frac{\sin A}{2b^3c^2}\int_o^b\int_o^{x'}(2u^3+2b^3-3b^2u)x^2dudx$$
$$=\frac{c\sin A}{6b^6}\int_o^b(2u^6+2b^3u^3-3b^2u^4)du$$
$$=\frac{13bc\sin A}{420}=\frac{13}{210}\tfrac{1}{2}(bc\sin A)=\frac{13}{210}\text{ (area of given triangle)}$$

9. **Proposed by H. C. WHITAKER, B. S., M. E., Professor of Mathematics, Manual Training School, Philadelphia, Pennsylvania.**

Four numbers taken at random are multiplied together. What is the probability that the last digit will be 0?

I. **Solution by H. W. DRAUGHON, Clinton, Louisiana.**

The probability that the final digit will be odd is $(\frac{5}{10})^4=\frac{625}{10000}$; the probability that it will be 2, 4, 6, or 8, is $(\frac{4}{10})^4+4(\frac{4}{10})(\frac{4}{10})^3+6(\frac{4}{10})^2(\frac{4}{10})^2+4(\frac{4}{10})^3(\frac{4}{10})=\frac{15(4)^4}{10000}=\frac{3840}{10000}$. $\therefore$ the probability that it will be 0 is, $P=1-\frac{3840}{10000}-\frac{625}{10000}=\frac{5535}{10000}=\frac{1107}{2000}$.

II. **Solution by F P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.**

We know from *Hall and Knight's Higher Algebra* if n integers be taken at random and multiplied together, the probability that the last digit of the product is 1, 3, 7, or 9, is $P_1=\frac{4^n}{10^n}$; also, the probability that the last digit of the product is 2, 4, 6, or 8, is $P_2=\frac{8^n-4^n}{10^n}$; and, finally, the probability that the last digit of this product is 5, is $P_3=\frac{5^n-4^n}{10^n}$. Consequently the probability that the last digit of this product is *zero*, when $n=4$, is $P_4=1-(P_1+P_2+P_3)$; that is, $P_4=\frac{10^4-8^4-5^4+4^4}{10^4}=\frac{(5^4-4^4)(2^4-1)}{5^4\times2^4}=\frac{1107}{2000}$.

Solutions to this problem were also received from *Hon. JOSIAH DRUMMOND, P. H. PHILBRICK* and *J. F. W. SCHEFFER.*

PROBLEMS.

18. **Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.**